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**Published:**

- *with international search report*
- *with a declaration as to non-prejudicial disclosures or exceptions to lack of novelty*

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**BODY JOINT LINER****TECHNICAL FIELD OF THE INVENTION**

This invention relates to a liner particularly a body joint liner such as an ankle  
5 brace for human use.

**BACKGROUND OF THE INVENTION**

There are a variety of known ankle brace designs of a type frequently known as clam shell ankle braces. These braces consist of a pair of shells with body joint liner inserts so that the construction can be attached to either side of for  
10 example the ankle joint. They are frequently fitted following common soft tissue ankle injuries, such as those known as inversion injury or oedema (swollen tissue). Following the injury regaining ones health and fitness as quickly as possible is important. A contributing factor which influences the healing process is the ease with which tissue fluid drains from an injury site. Also muscle  
15 surrounding the body joint may be damaged and this can affect a person's balance. Existing braces provide a moulded foam liner with a straight channel running up the middle of the liner. This channel provides an area of lesser pressure and so encourages drainage of tissue fluid following the common inversion injury.

20 Proprioception refers to a sense of position for a body. In the soft tissues around a joint there are "sense of position receptors" which provide information to the brain which then in a reflex fashion instructs muscle to move to control positional movement. Although ligaments stabilise joints in a static sense, it is the dynamic stabilisation of joints achieved by the muscles that cross them, that  
25 is primarily in control. After an injury there is proprioceptive lag which makes the ankle more susceptible to a lack of stabilisation because the muscle reflex is less responsive.

It has been found that many of the known body joint liners fail to achieve satisfactory results in that the healing process which involves the movement of tissue fluids can be too slow and the liner can be too uncomfortable to wear due to high skin pressures.

5

### **OBJECT OF THE INVENTION**

It is an object of the present invention to provide a liner which will reduce the foregoing disadvantages in a simple yet effective manner or which will at least provide the public with a useful choice.

#### **10 STATEMENT OF THE INVENTION**

Accordingly in one preferred form of the invention a liner is provided which has an inner face and an outer face, the inner face having therein a channel open at one end and closed at the other end, the channel being substantially of constant width and depth over at least a substantial portion of the length of the channel, 15 and at least part of the inner face being shaped to substantially approximate the contours of a selected joint of the human body.

Preferably the liner is elongated, the channel running substantially axially along the liner.

20

Preferably the liner has a concavity therein, the closed end of the channel being at or about the concavity.

25 Preferably a substantially rigid cover is provided shaped to receive the outer face of the liner.

Preferably the cover and liner are adhered one to the other.

To those skilled in the art to which the invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the scope of the invention as defined in the appended claims. The disclosures and the description herein are 5 purely illustrative and are not intended to be in any sense limiting.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

The invention consists of the foregoing and also envisages constructions of which the following gives examples.

10 One preferred form of the present invention will now be described with reference to the accompanying drawings in which,

FIGURE 1 is an inside perspective view of a liner according to one preferred form of the invention,

15 FIGURE 2 is a perspective view of the outer face of the liner of Figure 1,

FIGURE 3 is a longitudinal cross section through the liners of Figures 1 and 2,

20 FIGURE 4 is an internal perspective view of a cover intended for use with the liner of Figure 1,

FIGURE 5 is an external view of the cover of Figure 4, and

25 FIGURE 6 is a longitudinal cross section view of the cover of Figures 4 and 5.

**DETAILED DESCRIPTION OF THE DRAWINGS**

Referring to the drawings, a liner 1 is provided which may be formed of a foamed plastics material so as to provide the necessary "softness" and not to provide substantial hardness or hard edges against the body of a user.

- 5 A channel 2 is provided on the inner face 3 of the liner. The inner face 3 is shaped over at least part thereof to the contours of a selected joint of a human, in particular, the ankle. The channel 2 is desirably of substantially constant width and may be of substantially constant depth along substantially all its length, however there may be some taper towards the upper end 6 or extra depth at a concavity 4. The concavity 4 is provided in the liner 1 shaped so as to be a fit over the inner or outer ankle parts for example of a user. The channel 3 is closed at end 5 and end 5 is positioned substantially at the centre point of the concavity at 4. The channel is open at end 6 which is the upper end in use.
- 10
- 15 In transverse cross section the liner 1 is also desirably formed to a curve that will generally fit against the leg of a user above the ankle joint. The channel 3 is in addition to the general curve to fit the leg of the user. The dimensions of the channel do not have to be precise but by way of example the channel could be about 25-30mm wide in a total line width of the liner of about 85-90mm. A suitable depth could be about 4mm deep at its deepest point in the concavity and about 1 to 2mm adjacent the open channel end and along most of the length of the channel 3.
- 20

- 25 The liner 1 desirably is engaged by a cover 10 which may be formed of a plastics material desirably a hard plastics material. The cover 1 is desirably shaped so that the inner surface 11 thereof will substantially fit the outer surface 12 of the liner 1. Thus the liner 1 may be placed inside the cover and is desirably engaged therewith for example by an adhesive such as glue, double sided tape or the like.

The outer face 13 of the cover 10 may be formed to any desirable shape and may for example include slots 15 and 16 able to receive fixing devices and other constructions such as a depression 17 to allow identification material to be  
5 placed therein.

In use the liner 1 is engaged with a cover 10 and a pair of such constructions may be provided about a user's ankle. The construction may be positioned for example by straps or a stocking or in other ways so that the channel 2 has its  
10 end 5 adjacent an ankle. The channel 2 provides a channel by which the fluids caused by injury for example may drain away from the injury site adjacent the ankle. As the construction is relatively soft there is little or no effect on the sense of position receptors in the vicinity of and about the ankle, which is desirable.

**WHAT WE CLAIM IS:**

1. A liner having an inner face and an outer face, the inner face having therein a channel open at one end and closed at the other end, the channel being substantially of constant width and depth over at least a substantial portion of the length of the channel, and at least part of the inner face being shaped to substantially approximate the contours of a selected joint of the human body.
- 10 2. A liner as claimed in claim 1 wherein the liner is elongated, and the channel runs substantially axially along the liner.
3. A liner as claimed in claim 1, wherein the liner has a concavity therein, the closed end of the channel being at or about the concavity.
- 15 4. A liner as claimed in claim 1 further including a substantially rigid cover and shaped to receive the outer face of the liner.
5. A liner and cover as claimed in claim 4 wherein the cover and liner are 20 adhered one to the other.

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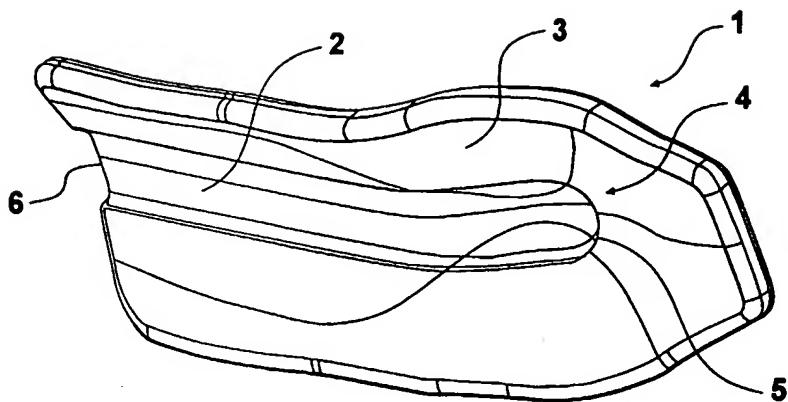


FIG. 1

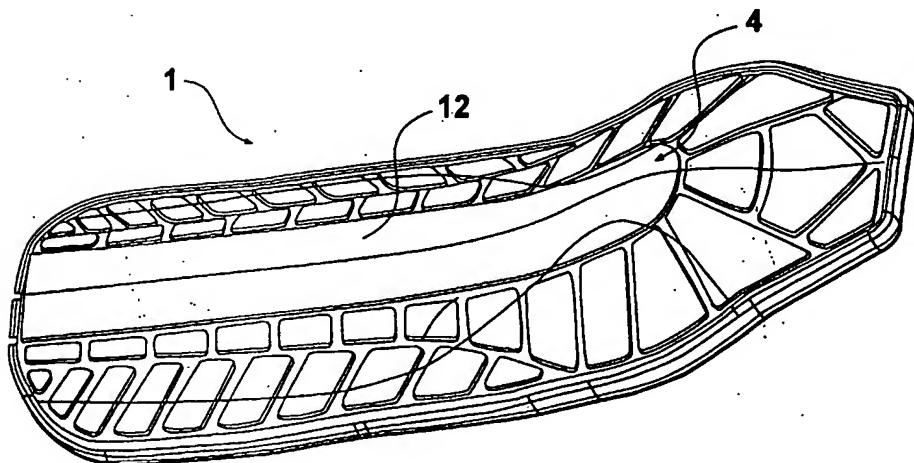


FIG. 2

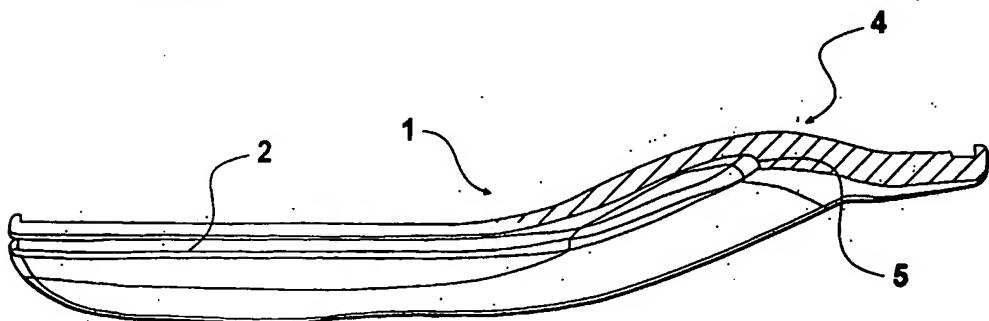


FIG. 3

SUBSTITUTE SHEET (Rule 26)

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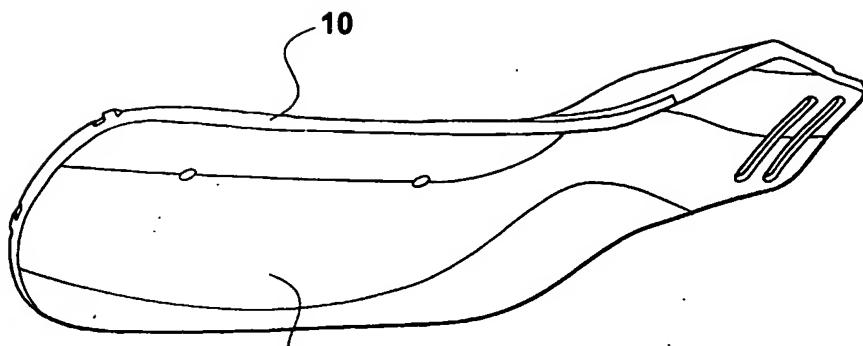


FIG. 4

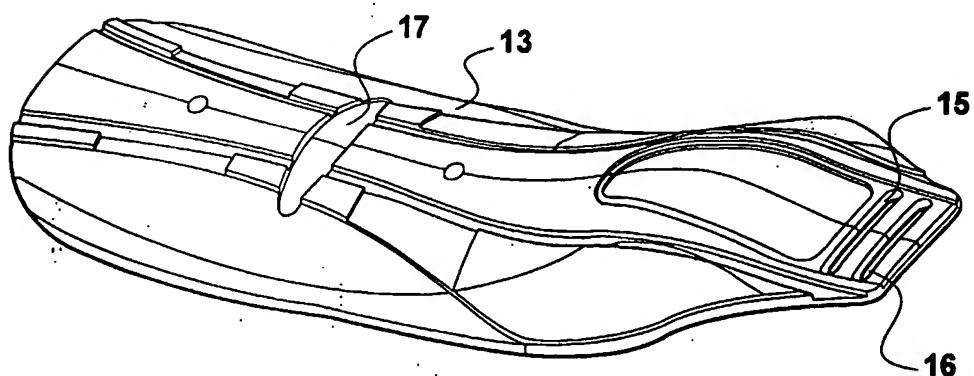


FIG. 5

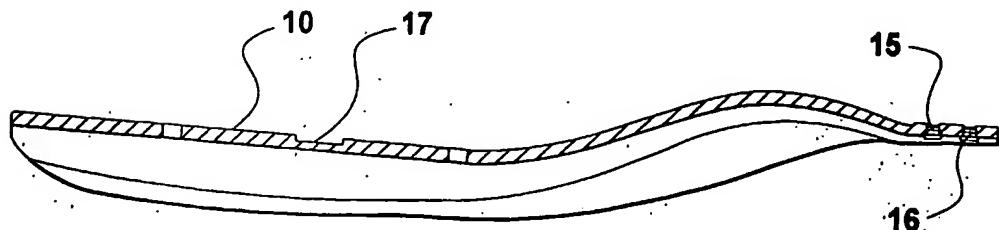


FIG. 6

VIII-5-1	<p>Declaration: Non-prejudicial disclosures or exceptions to lack of novelty</p> <p>Declaration as to non-prejudicial disclosures or exceptions to lack of novelty (Rules 4.17(v) and 51bis.1(a)(v));</p> <p>Name:</p>	<p><b>in relation to this international application</b></p> <p><b>SOMAR TECHNOLOGIES LIMITED declares that the subject matter claimed in this international application was disclosed as follows:</b></p>
VIII-5-1 (v)	This declaration is made for the purposes of:	<b>all designations</b>

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ03/00121

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
Int. Cl. <sup>7</sup> : A61F 5/04		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols)		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) DWPI: IPC A61F 5/-, A63B 7/- and keywords; liner, insert, pad, cushion, inlay, spacer, buffer, groove, channel, drain, gutter, furrow, indentation, straight, axial, elongation, length, shell, casing & similar terms		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X, P	US 2003/0014000 A1 (GILMOUR) 16 January 2003 See the whole document	1 - 3
Y, P Y, P	US 5389065 A (JOHNSON JR) 14 February 1995 See col 6, lines 11 to 18	4, 5 4, 5
Y, P	US 5676642 A (PETERS) 14 October 1997 See col 5, lines 35 to 49	4, 5
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C		<input checked="" type="checkbox"/> See patent family annex
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>		
Date of the actual completion of the international search 21 August 2003	Date of mailing of the international search report 08 SEP 2003	
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer VINCE BAGUSAUSKAS Telephone No : (02) 6283 2110	

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A	US 6328706 B1 (YATTAVONG) 11 December 2001 See the abstract	

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Patent Document Cited in Search Report		Patent Family Member
US	2003/0014000	NONE
US	5389065	NONE
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